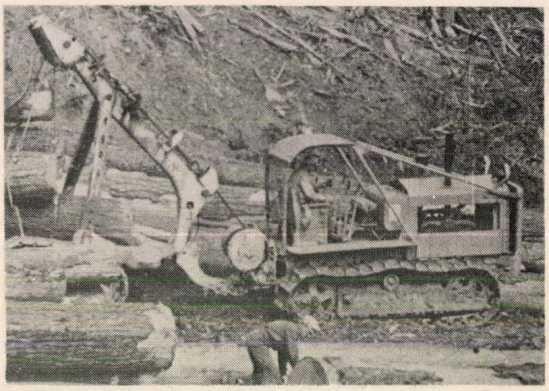
INTERMOUNTAIN STATION
Central Reference File
No. 0.73

NORTHEASTERN LOGGERS' HANDBOOK

by

Fred C. Simmons

PRELIMINARY REVIEW EDITION



Easier and Safer Work

Greater Production (more pay) and Better Living Conditions

SECTION 14:— LOADING

NORTHEASTERN FOREST
EXPERIMENT STATION

United States Department of Agriculture

FOREST SERVICE
NORTHEASTERN FOREST EXPERIMENT STATION

614 Bankers Securities Building
Philadelphia 7, Pennsylvania

V. L. HARPER, DIRECTOR

FOREST UTILIZATION SERVICE
James C. Rettie, Chief

If you want to be a mechanic, you will easily find plenty of good books which will tell you what you need to know. You will also find plenty of instructors and training shops.

What about the young man who wants to make his living by logging? For him there is no good source of information to which he can turn. The books and courses on logging are for the logging engineers--not for the fellow who uses the axe and crossout.

Why shouldn't there be a simple illustrated handbook which will tell the young woodsman (or the green woodsman) what he needs to know about the care and use of his tools and the best of the old and the new techniques of, and devices for logging? He needs to know the "tricks of the trade" as much as anyone.

We hope that these pages, together with other short papers like it, will finally be put together in a printed NORTHEASTERN LOGGERS' HANDBOOK. We are putting it out in this form first because there seems to be an urgent need for this sort of information; and because we need the help and advice of persons who know about logging in our region before printing. We want the experienced logger to tell us what important things we have missed and where our advice is not good. We want the young man going into the woods for the first time to tell us what parts of it he finds hard to understand, to suggest how it can be made more useful to him. We would like the equipment manufacturers to check our recommendations for use of their products and tell us about new devices they are developing.

Please send criticisms, questions and suggestions to: The Director, Northeastern Forest Experiment Station, 614 Bankers Securities Building, Philadelphia 7, Penna. Additional copies of this and other publications in this series can be obtained from the same address.

1946

SECTION - 14.

LOADING

By Fred C. Simmons*

Judging from the number of systems and devices developed to help do the job, loading the products of their operations for the haul to the mill is about the toughest problem of Northeastern loggers. The variety of conditions under which loading has to be done adds to the multiplicity of loading devices. Loading can be either "hot", with the sticks going onto the trucks or sleds just about as fast as they are skidded from the woods; or "cold", with the sticks accumulating at a yard or landing in considerable quantities and for some time before they are loaded out. It can be on a level spot or on a hillside, and in the latter case from above or below the road. And it can be of short bolts, normal log lengths, or tree length sticks.

Loading Short Bolts

The majority of short bolts, for pulpwood, distillation wood, millwood or fuelwood that are cut in the woods or at the landing are still loaded by hand, often with the aid of the pulphook as illustrated and described in Section 5. In the southern part of the Region the pulphook is almost unknown, and the hand loading is usually done without the aid of any mechanical help.

Because of this hand loading the size of the sticks has had to be kept down. Distillation wood in Pennsylvania, for example, has had to be handled six times between the stump and the retort: (1) ricking in the woods; (2) loading on a stoneboat for skidding to the road; (3) ricking at the roadside; (4) loading on a truck for hauling to the mill; (5) ricking in the mill yard and (6) loading on the retort buggy. Pulpwood, cut at greater distances from the using plant, has frequently been handled many more times than this. So pulpwood and distillation wood bolts have been cut and split to sizes that could be easily handled.

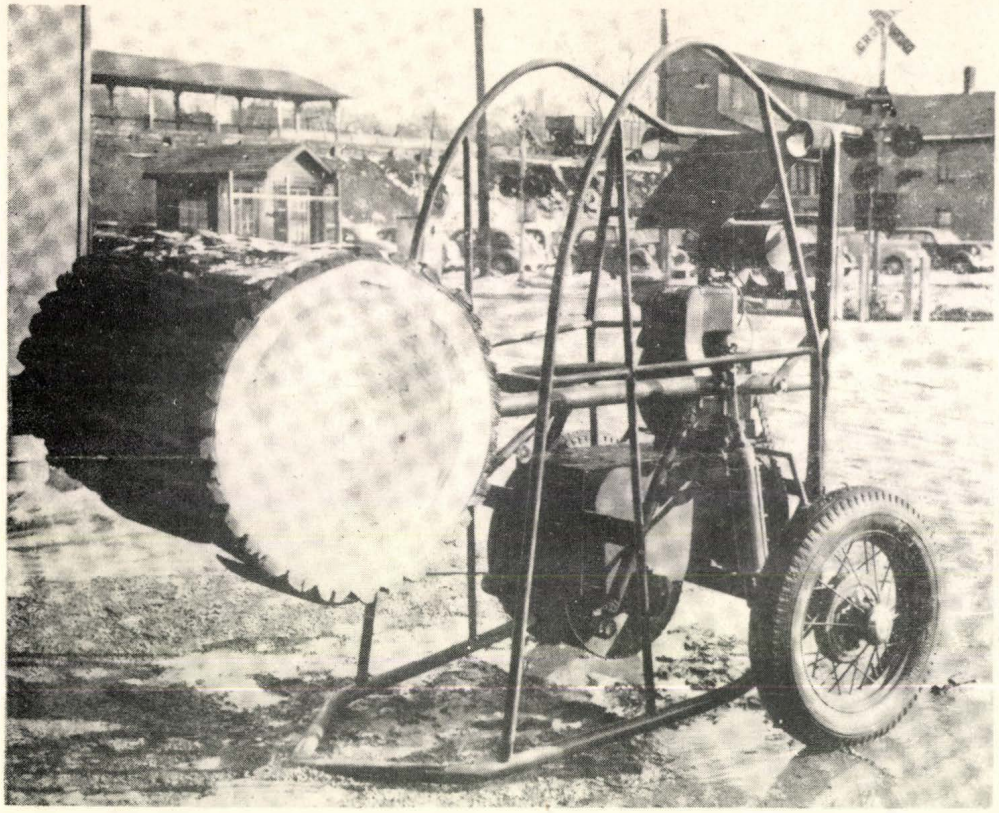
Several solutions to this wasteful use of hand labor are being developed. One, the cutting and hauling of longer lengths, will be discussed later on in this section.

* Specialist on Logging.

A number of different types of conveyors have been developed to aid in getting heavy sticks up to the truck bed. The simplest of these consist of a small triangular frame, on skids or wheels, with a 2 or 3 horsepower gasoline motor mounted in it to supply power for a conveyor chain which carries the bolts up the slope, either endways or sideways to the truck bed. These conveyors enable one man to load heavy, unsplit, hardwood bolts, that it would take four men to lift by hand. They require the bolts to be hauled practically to the truck tailgate, however, and to be carried from the tail of the truck bed to their place in the pile.

More elaborate rigs have been developed. Most of these are mounted on old automobile chassis or on tractors. Most of them have the conveyor chain in three sections. The sloped conveyor is similar, but longer and taller than the one in the machine described above. On its tail end there is another section which lays on the ground, enabling the loaders to feed it from considerable distances, sometimes across a ditch from the road. And as a snout, above the truck bed, is another section, which carries the bolts up to just behind the cab, where the first tier of the load is to be erected.

Many of these snouts are hydraulically operated, so that the delivery point of the bolts can be raised as the height of the pile increases. When the first tier is completed the truck moves ahead a short distance and the second tier is put in, and then in most trucks a third move is made and a third tier is loaded. With such a loader, with two men feeding it and a third man on the truck, loads of three cords of four foot wood can be easily put in in an average of 15 minutes. Five men working without the loader, could not do the job in 45 minutes.

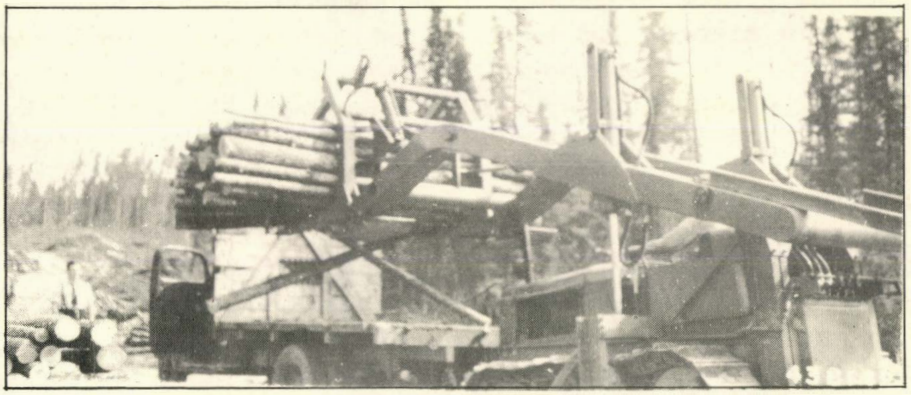


Another device, designed for the same purpose but operating on a different principal, is illustrated above. It was invented by a Berlin, N. H., mechanic and is being manufactured by an upper New York State pulpmill supply house. As can be seen it has tubular steel arms upon which the bolt is loaded, and then it picks it up, and flips it crossways into the back of the truck bed. The arms operate at the rate of about four strokes a minute, and 5½ cords of 4-foot wood are loaded in about 30 minutes. It requires the bolts to be carried practically to the tail-gate, and to be carried away from the rear of the truck bed, as does the small conveyor loaders first described above. This device costs about $1,000.

Except for very short sticks (under 24") any loader which piles the sticks in the conveyance rough and tumble is generally not considered economical because the load capacity is so greatly reduced. During the war rough and tumble loading of four foot wood in freight gondolas was resorted to in some instances due to lack of labor, and it was found that their capacity was reduced about one third under that obtained by hand stacked wood. Shorter sticks, however, can be rough and tumble piled more economically.

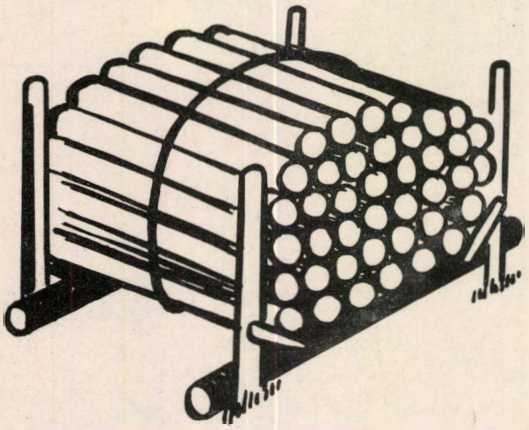
Distillation wood operators have found that they can get as much volume of unsplit 12 or 16 inch sticks in a stake truck body or retort buggy rough and tumble as they formerly got of 52 inch sticks carefully piled.

Another approach to the problem of loading short lengths of wood is package handling. A partial use of this principal is the skid loader developed by a midwest equipment manufacturer.



This device consists of hydraulically operated arms mounted on a long wheelbase crawler tractor that can be pushed into a pile of wood, then closed over a half cord or so which can be lifted, the tractor turned, and the load dropped onto a truck or railroad car. This device has been very successful in handling 100" wood, and can handle 60" wood pretty well, but so far has not been developed to handle 48" wood successfully. The ricks topple over too easily when the arms are inserted under them, and the sticks fall out of the arms when they are lifted. This skid loader costs about $3,000 in addition to the cost of the tractor.

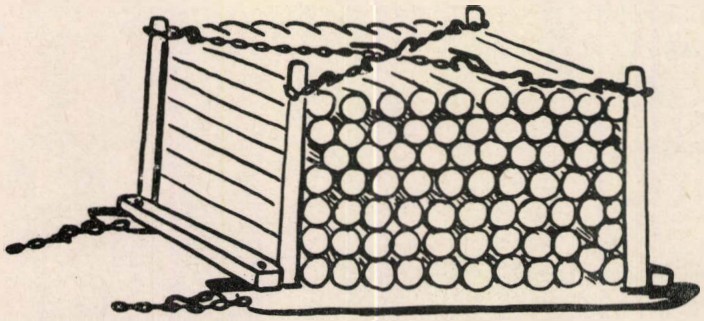
The most successful example of package handling is a big pulp operation in Newfoundland that supplies several mills in Canada and in New York State.



Cradle for packaging pulpwood

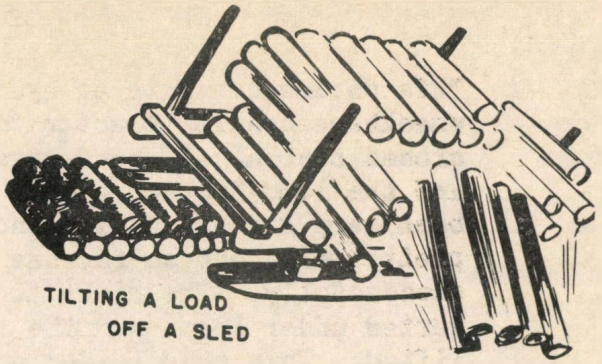
Here the wood is piled by hand in cradles, and steel straps are cinched down around bundles of about half a cord. The wood is then handled in these bundles in its various transshipments from truck to railroad car, to boat, and back to railroad car, and truck again to the yard of the using mill.

Several attempts have been made to build up packages of four foot wood in the woods on skids, chaining the load down so that it can be skidded out of the woods, loaded on trucks, and then unloaded in the mill yard in the same unit. So far none of them have been too successful. The loads have been too prone to come apart in transit, and the equipment necessary to handle such heavy packages has not been available. There is always some wasted space in the conveyances used in handling such packages.



PROPOSED SKIDDABLE PULPWOOD PACKAGE

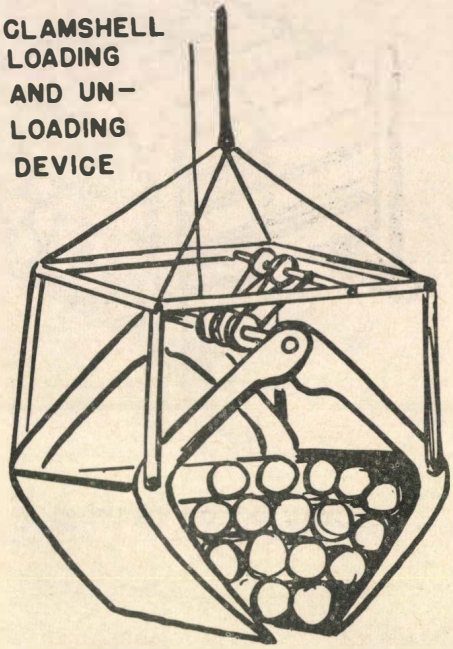
Unloading short bolts from a truck, sled, or railroad car, also presents its difficulties. The vast majority of it is probably still unloaded, as it is loaded piece by piece, by hand. Some ingenious devices have been developed for this unloading however.



TILTING A LOAD OFF A SLED

One is a simple ramp, upon which one sled runner or pair of truck wheels are driven to tilt the conveyance enough so that the loaded wood will slide or roll off. Pulpwood can be frozen into such a ramp conveniently. If the wood is piled lengthways of the vehicle, some sort of quick release bunks, such as those described in the next portion of this section, will be required. If it is piled crossways no side restraint is needed, but usually a greater angle of tilt is necessary to get the wood off.

Packaged wood, of course is usually unloaded with a crane and in some cases unpackaged wood is unloaded with a similar device, using clamshell tongs, or a choker cable passed around the pile.



CLAMSHELL LOADING AND UNLOADING DEVICE

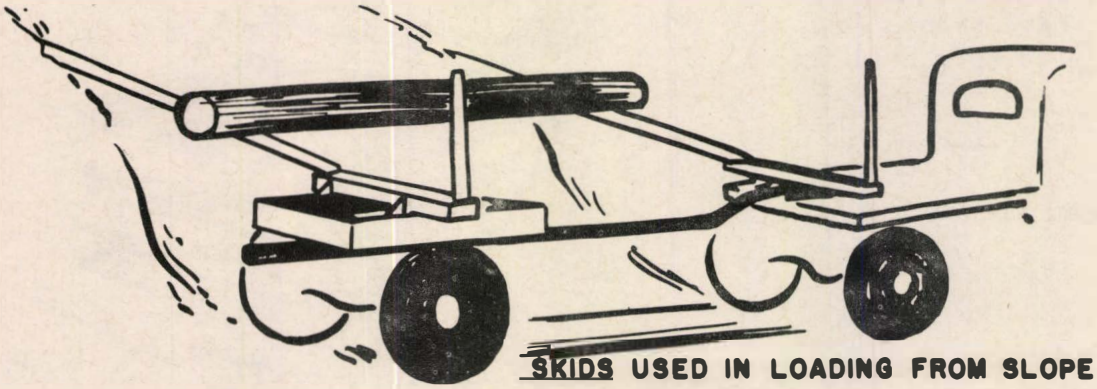
Usually these devices are slow in grabbing a load, and do not carry it too firmly, so that they are dangerous to work around, and cannot be depended upon to put the wood all in one place.

Loading Average Logs

A large number of pulpwood and other short wood users are going into the hauling of their wood in log length, rather than bolt size, largely because of the greater efficiency of the devices used for loading and unloading this length wood.

Because of their weight and bulk, very few logs are picked up bodily and thrown into a truck or sleigh by hand. Some tie cuts are loaded in this manner, and some of the smaller logs for the wood turning and softwood sawlog industries, but even with this size material loading by hand is back-breaking work.

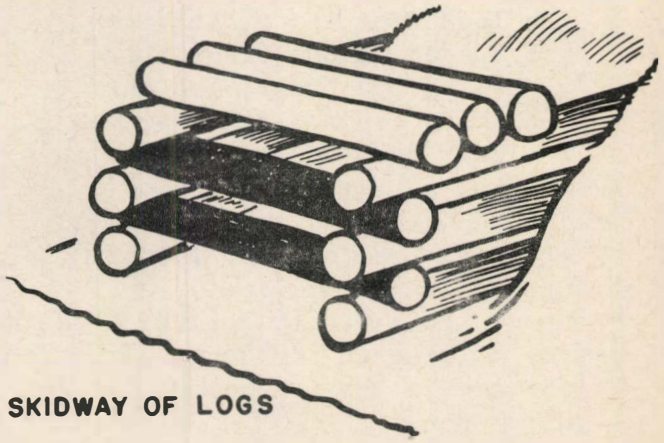
Long ago loggers found that this work could be reduced by cutting a couple of skids from poles, leaning these against the bunks upon which the load was to be placed, and rolling on the logs.



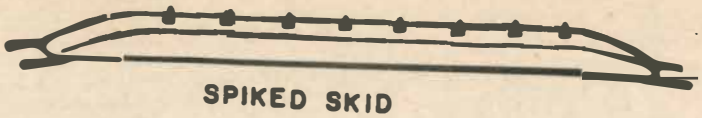
SKIDS USED IN LOADING FROM SLOPE

In hilly country a loading point can usually be found where such skids can be placed from the slope on the level to the bunks. On a hot logging job the logs can be delivered by skidding them directly across the base of the skids and then rolling them onto the conveyance.

On a cold job, however, or even on a hot job where the slope is more gentle, a skidway is needed. This is a cribwork, usually of cull logs, built up on the hillside. The front end is about on the level with the bunks of the transportation device, and the back is dug into the slope. On such a skidway, logs can be accumulated off the ground where they will be partially protected from rot until transportation can be provided for them.

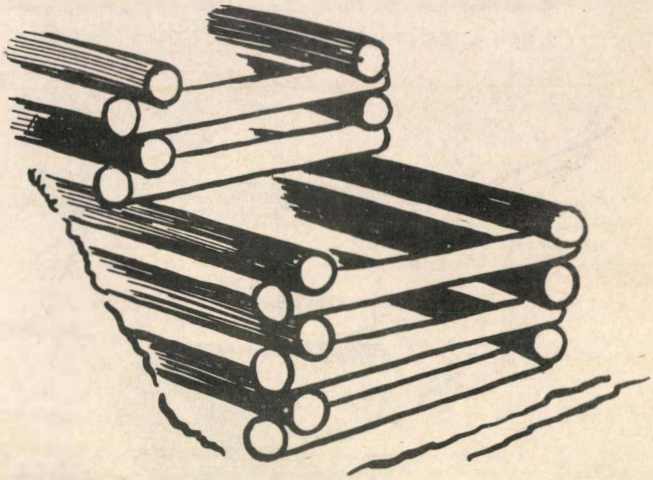


SKIDWAY OF LOGS



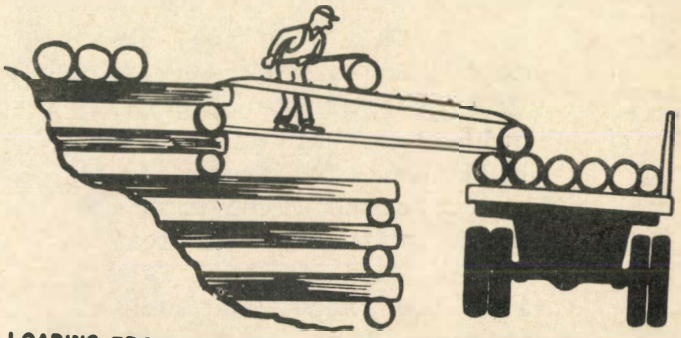
SPIKED SKID

When it is, short skids can be placed from the front of the skidway to the bunks and the logs rolled on. One type of skids very useful for this purpose is shown here. They are squared timbers, 4" X 4" or 6" X 6" depending on the size of the logs to be handled. On each end horseshoes with sharpened cleats have been spiked to give them a firmer grip on the ends of the skidway or on the bunks. Along the top, round iron spikes sharpened to a blunt point have been placed at 4" intervals to help hold the log.



DOUBLE DECKER SKIDWAY

Double decker skidways are sometimes built to help load high loads of logs. They consist of another cribwork of logs, built on top of the first skidway and offset back several feet. Logs are loaded on both tiers. Then when the conveyance arrives, the logs from the first deck are loaded in the first tier or two on its bunks, and then the skids are moved up between the next deck of the skidway and the top of the logs already loaded, and a third and possibly a fourth tier of logs loaded.



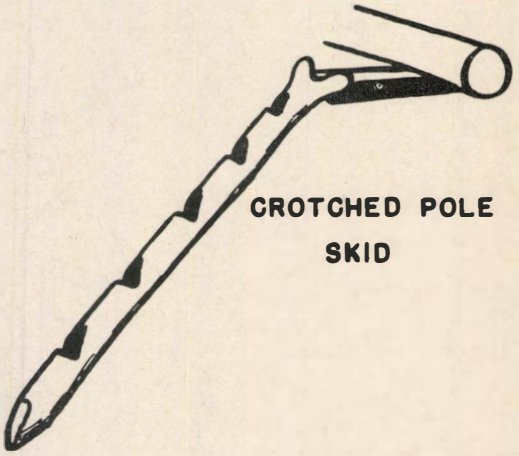
LOADING FROM TOP DECK OF DOUBLE DECKER SKIDWAY

In all this loading a canthook or peavy is the tool commonly used for rolling on the logs. Over long spans a catwalk or plank from the skidway to the conveyance is sometimes provided for the log rollers to work upon.

Loading from level ground is something else again. Here, when skids are used, they must be at a considerable angle, and rolling a log up them by hand is considerably more difficult. It is frequently done, however. Here spiked skids are even more useful than they are for level rolling. One canthook man, attempting to roll a log up such

a pair of skids must be constantly on the alert that he does not lose his grip, and the log roll back on him. Sometimes when spikes are not available a round skid will be notched at intervals, to help hold the log while the canthook men are getting a fresh grab.

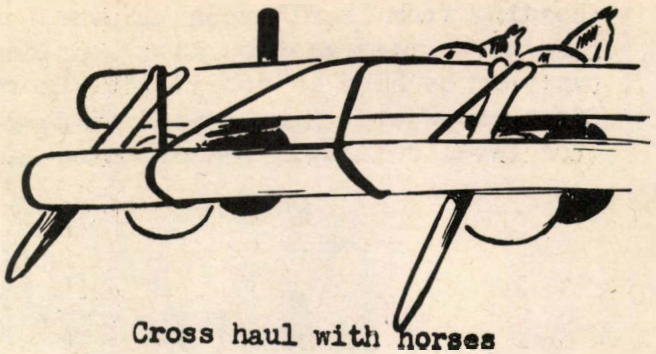
One type of skid that is very useful for loading from the ground is made from a crotched pole cut off close above the crotch, and flattened off at both ends. When loading is started the crotched end is placed on the bolster to help insure against the skid slipping sideways with a load upon it. When the first tier of logs is built up the skids are placed against the side of the outside log. As the load is built up and the angle of the skid grows steeper the crotched end is grounded.



CROTCHED POLE SKID

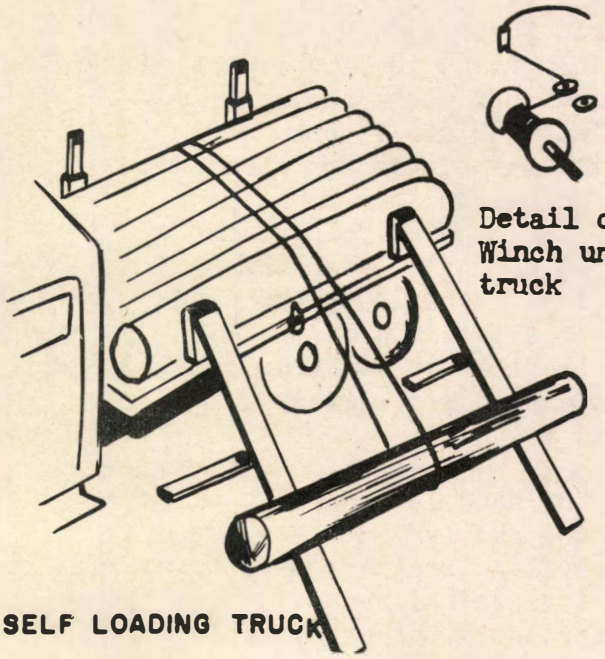
The difficulty of hand loading with skids from level ground has led many loggers, including some of the smaller ones, to use some mechanical means of putting their logs on the bunks. The simplest, and probably the commonest, is probably the cross haul, using horses or a tractor as the motive power.

The cross haul consists of a chain or cable passed from the bunks down around the log, and back up across the bed to the motive force on the other side. An illustration of a simple cross haul, using horses as motive power and a chain around the log is given below:



Cross haul with horses

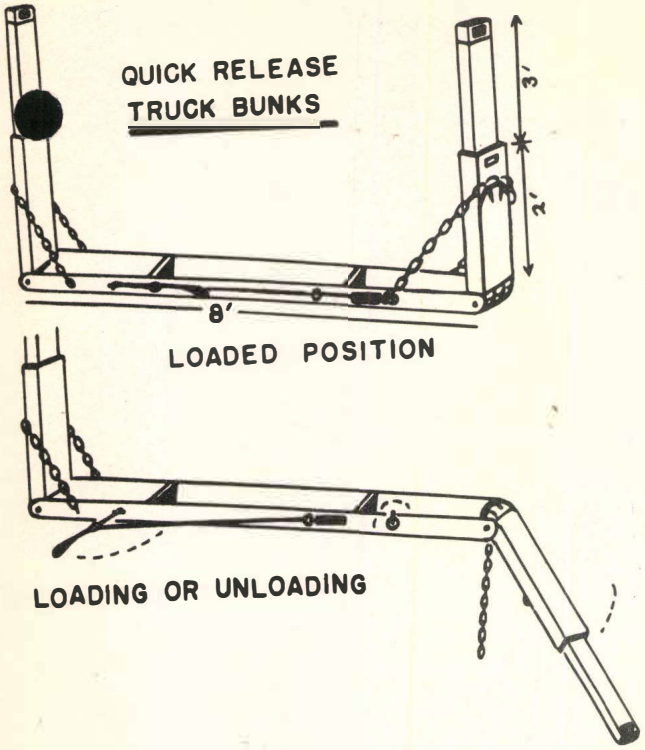
The newest thing in the Northeast is the use of the motor truck motor as motive power. In this case, as illustrated below, a winch powered by a power take-off behind the truck transmission, is placed crossways under the center of the truck bed. Two sheaves are placed to the rear of this winch so that its cable can be brought out on either side, the one opposite which the loading is to be done in each case. A socket is provided in the middle of the edge of the truck bed into which the shank of a special pulley is placed, through which the cable is passed to carry it up over the load. The cable is then passed down around the log to be loaded and back up to the truck bed, the power is turned on, and the log is rolled up the skids.



Detail of Winch under truck

SELF LOADING TRUCK

Another interesting feature of this set-up is the quick release steel bunks provided. Diagrams of these bunks and a photograph of the load being released are shown here:



As can be seen the sides of these bunks are built in two sections. The lower section is of steel, and is hinged to the steel cross bunk.

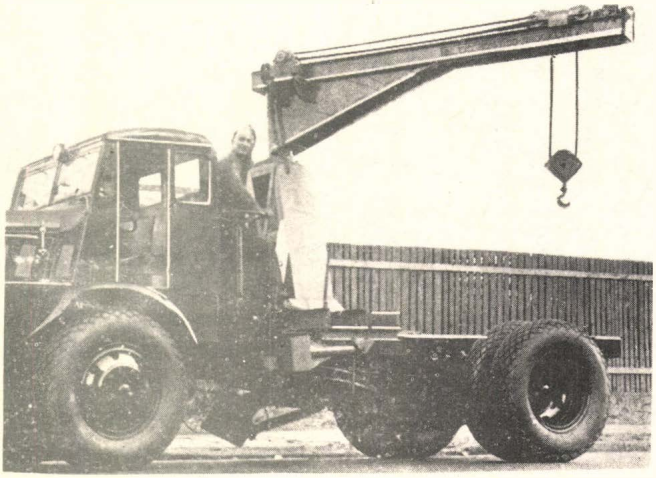
The upper section of the uprights is 2" x 6" hardwood fitting into a socket in the top of the steel sections. A chain holds the whole side upright. One end of this chain is held in place by a pin, which in turn is held in place by a steel sleeve attached to a rod which terminates in a lever on the other side of the truck. When the lever is pulled back the sleeve draws back, releases the pin, which in turn lets the end of the chain snap loose allowing the bunk upright to drop over the side of the truck. In this position it forms a skid for the load of logs to roll down to the ground or the pond.

In loading, the first tier of logs is dragged up the let-down bunk sides. Then the wooden 2" x 6" in the top is removed, and a skid with a hook in the end that engages a socket in the top of the steel portion is put in place over which the second and third tiers of logs are loaded as in the first illustration above. Finally the 2 x 6's are replaced, the skids are attached to the sockets in their tops, and the top tiers of logs loaded. With this rig, loads of hardwood logs up to 4,000 board feet are being assembled in Western Pennsylvania and New York State, frequently a few at a time on "milk route" pick up systems at a large number of farms and woodlots.

A number of patented quick release pockets for stakes in the end of truck bunks are on the market.

Finally there are the loading devices that lift the log off the ground and lower it on the conveyance.

One such device, the jib crane, is mounted on the truck itself, drawing its power, as in the device described above, from a power take-off on the truck transmission. A commercial model of such a jib crane is shown below:



The winch is powered by the truck motor. It can be provided with either a power actuated, or hand swung boom and is built in models to handle loads of from 1200 to 6000 lbs., 8 to 12 feet out on the boom. Since the tackle runs back and forth on the boom track this model is particularly adapted to handling bundled pulpwood or logs of varying length.

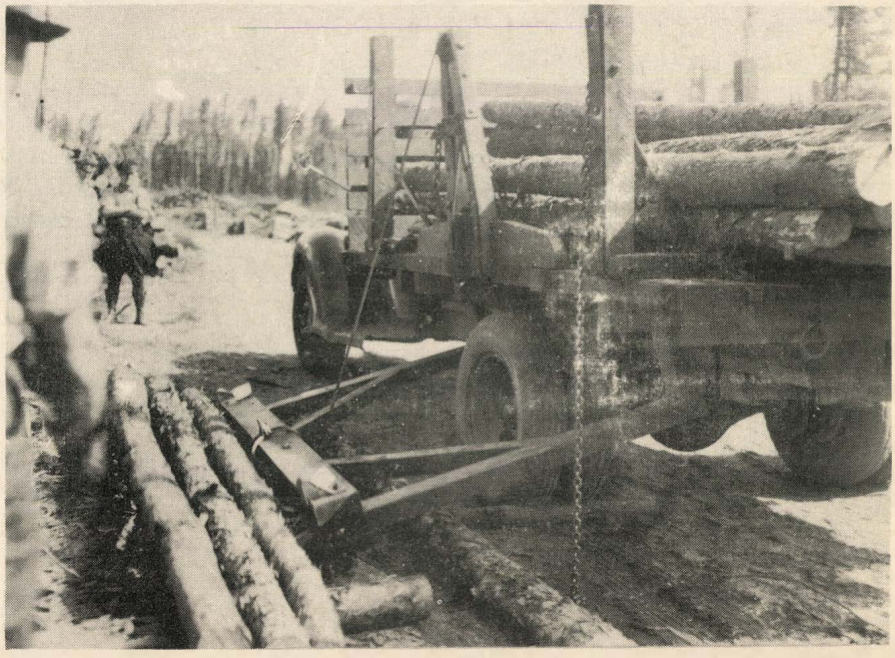
A number of versions of the jib boom have been constructed by loggers themselves. Below are two views of a very effective one constructed and used by the McManus Box Co., Rockland, Mass.

This rig is used not only to load logs weighing up to 2000 pounds, but also for skidding them in through the open pine woods, for distances ranging up to 300 feet. Its construction is shown quite clearly in the photographs. One unique feature is the tilt of the vertical boom member, which helps to center the log over the load automatically.

These jib boom cranes are a highly promising development for short logs mounted directly on the truck that is to carry the load.

The commercial models range in price from $1100 for the light hand swung crane to $3100 for the heavy power actuated boom model.

Another less expensive clever and effective device for lightlogs, is the "log flipper" invented by Bouffard, a pulpwood trucker from Matane, Quebec. Photographs of this flipper in use are given below:

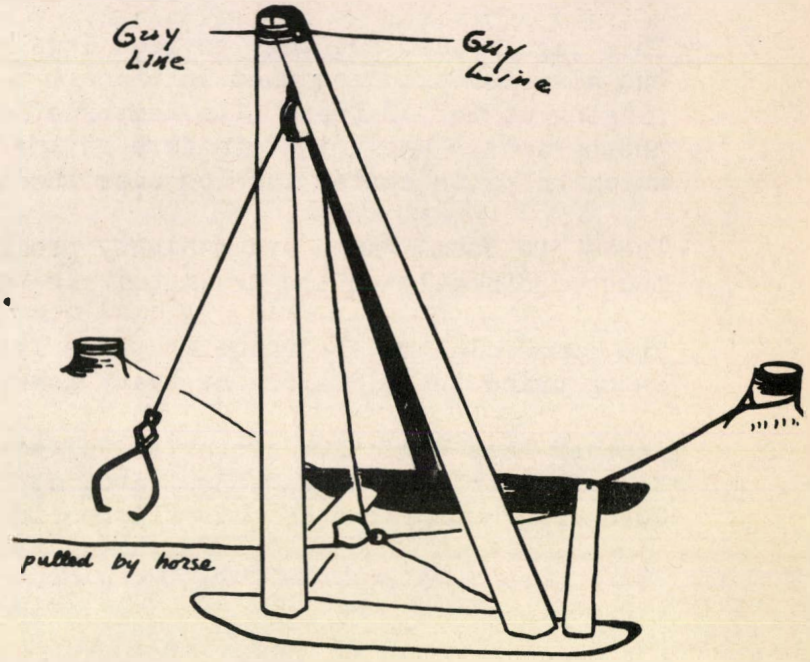


As can be seen, it also draws its power from a winch located under the center of the truck bed. It uses this power, however, to actuate two arms mounted on the side of the truck, each of which end in a cradle on which the log rides up to the top of the truck stakes. From there it flips over onto the truck bed. Over a hundred of these devices have been home built and installed on logging trucks by local mechanics in the maritime provinces of Canada.

Now Mr. Bouffard has patented it, in both Canada and the United States, and it is to be manufactured by an Ottawa foundry, which plans to market it complete for about $500.

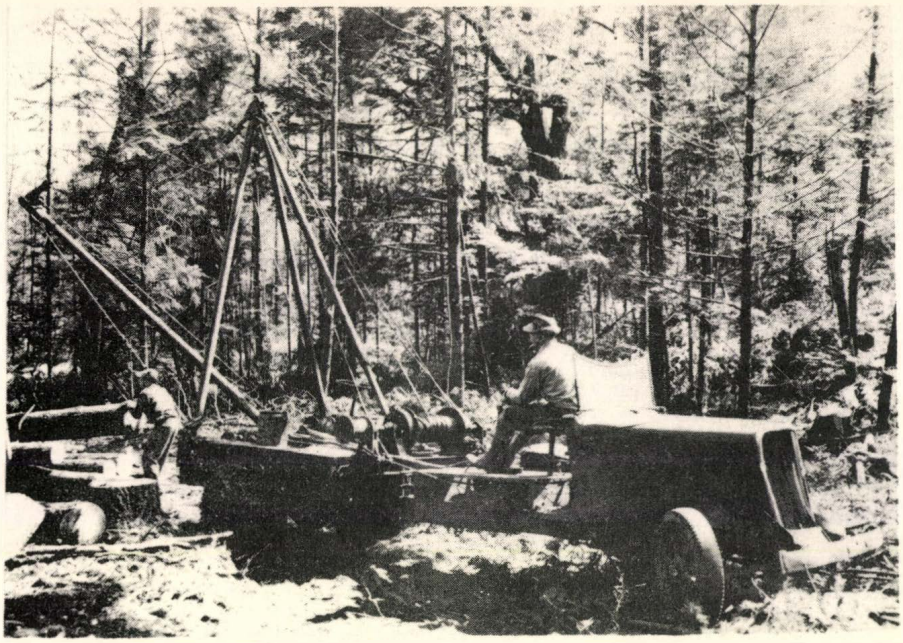
For use in loading sleds and wagons, and trucks with no power take-off there are the hoists and cranes mounted independently.

The old standby is the jammer illustrated here. The jammer is usually an A frame, mounted on a sled at an angle which will bring the sheave at its apex above the vehicle to be loaded. It may be powered by horses, by a tractor, or by a winch mounted on a tractor or attached to an independent motor. The jammer invariably has to be guyed, both at the bottom and the top, at each new setup, and moving it from loading point to loading point is a slow process, but it is cheap and effective device where conditions favor its use. It is sometimes used in decking a quantity of logs in the woods, and then to load the same logs out when transportation is available.



LOG JAMMER

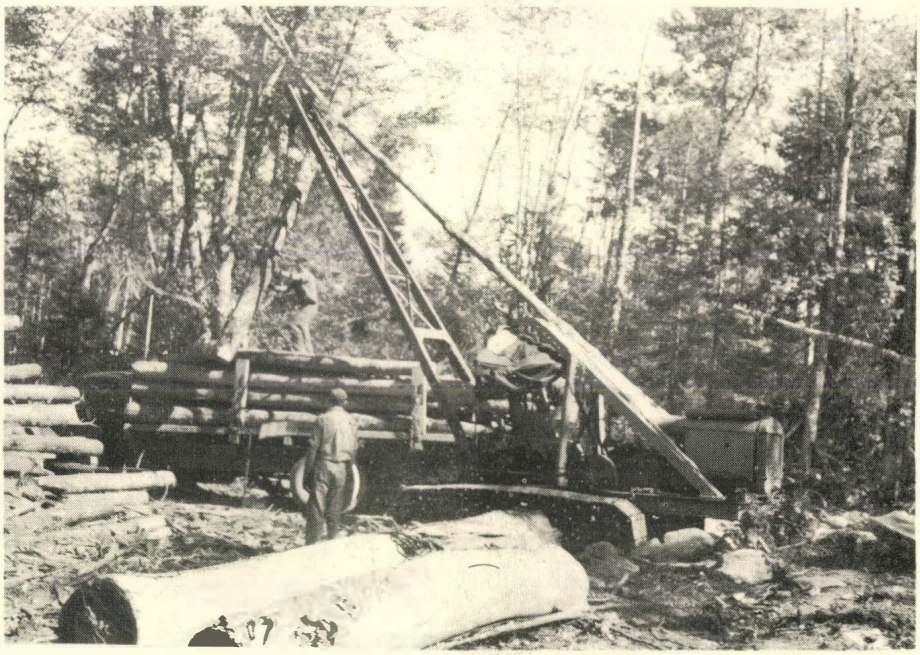
More flexible and maneuverable are the cranes and hoists mounted on trucks or crawler tracks. Some have a fixed boom like the jammer, and others a swinging boom actuated by gravity or by power. A home made loader, mounted on a telephone pole truck chassis, is illustrated on the next page.



It consists, as can be seen, of a tripod of 3" waterpipe mounted at the rear of the truck chassis, and a waterpipe swinging boom mounted behind this tripod. This boom is attached to the chassis by a universal joint. Its top is attached to the tripod by a wire rope which comes down to a hand operated winch. The boom is swung by cables on either side which come down to sheaves at the rear corners of the truck chassis and then along the edge of the frame and around to a drum underneath the operator. This drum is driven by a reversed transmission from an old Model-T car; when the operator steps on the reverse lever the boom swings to the left, when he steps on low it swings to the right, and when he places his foot on the brake lever it is stationary. The drag line, which goes up to the top of the tripod, then down to the base of the boom, and then along it to a sheave at its tip, is handled by the big truck motor-actuated winch in front of the operator. This loader handles logs up to about 1000 board feet, loading them at a rate of about one every two minutes from a deck about 50' from the vehicle to be loaded.

Many other more and less elaborate devices have been built by local mechanics throughout the Northeast, and mounted on trucks, sleds, and tractors. Stationary gin poles, using the same principal are also used as illustrated here.

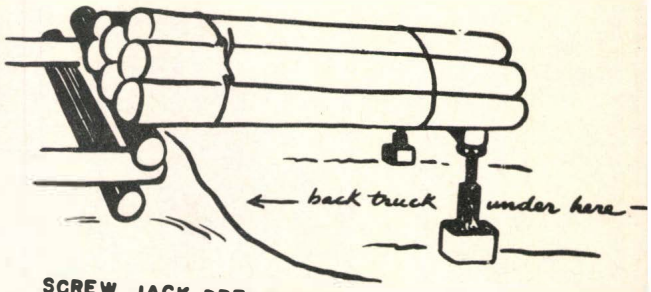
There are, of course, a variety of commercially built cranes, hoists, and shovels, on the market. Many of these are in use in Northeastern logging jobs. Some are mounted on trucks, some on sleds, and others on crawler tracks. Pictures of some of them are given below:



One other device remains to be described. This is the preloader, which is peculiarly adapted to use with tree lengths.

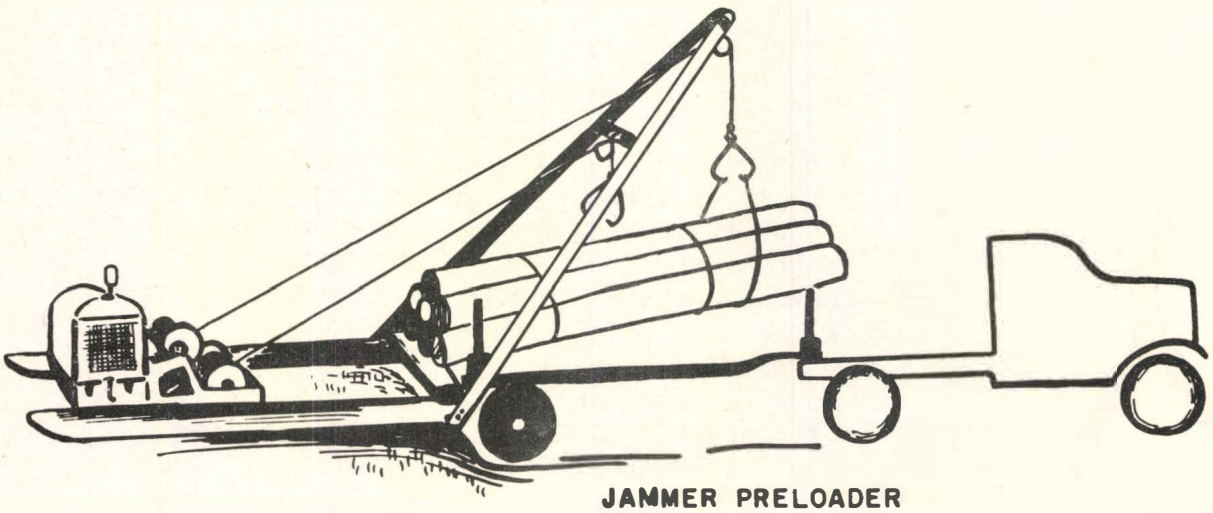
The log preloader is very similar to the devices used at many small Northeastern sawmills to place their lumber output in position for easy and economical pickup by the trucks and buggies carrying it to the railroad siding or sticking yard. (See Forest Products Note #2, Northeastern Forest Experiment Station)

Most of these devices involve suspending the load in such a position that the truck can be backed under it, the load can be dropped on the bunks, chained down and hauled away. The economies come in that the truck does not have to wait around while its load is being assembled, and that loading crew can work at a steadier, safer pace, instead of waiting around much of the time for a truck to come, and then working at high speed when one arrives to get it loaded and on its way quickly.

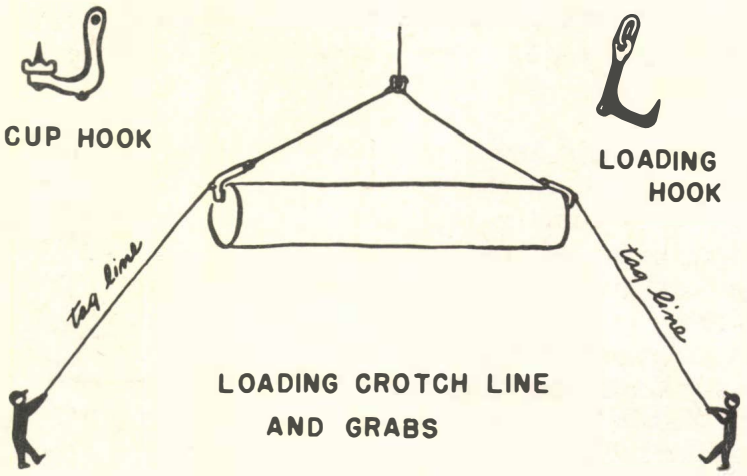


SCREW JACK PRELOADER

Logs can be assembled on a preloader by rolling by hand, by crosshaul, by a jammer, or by a crane. A diagram of a special jammer built for such assembly, and then for lifting the front end of the load while the truck backs under it, as installed on a job on Vancouver Island is given below:


JAMMER PRELOADER

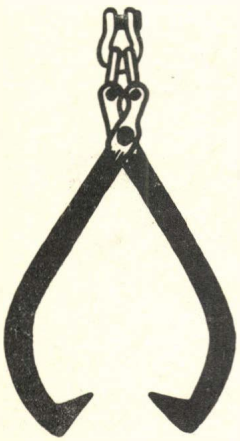
With all jammers, and free swinging cranes and hoists, there are two systems of loading: The use of tongs near the center of the log, as shown in most of these photographs; and the use of a crotch line and grabs in the ends of the log, as shown below:



LOADING CROTCH LINE AND GRABS

The crotch line requires more room between the boom and the load, and it requires two men to steady the load and swing it into place by the tag lines attached to the grabs. It probably is considerably safer, since the log is under better control on its journey through the air, and the log is gripped more firmly by the hooks in its ends. Many loggers maintain it is cheaper. The cup hooks grip the ends of logs, which are likely to split, more firmly. The log is more quickly and surely put into its place on the load. But many loading devices, including the jib cranes, do not provide enough room for use of a crotch line, and labor has not been available in many cases to man such a device. So loading tongs have come into more and more general use.

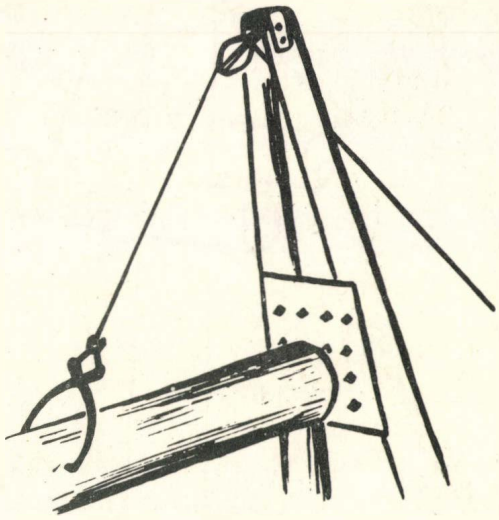
Loading tongs are very similar to the skidding tongs described and illustrated in Section 10 . They have somewhat shorter, more abruptly tapering points to facilitate rapid release of the log.



LOADING TONGS

These tongs are placed in about the center of gravity of the log by the hook tender who gets out of the way while the load is lifted and swung over the truck. It swings and twirls as it passes through the air, and the top loader on the truck has to catch one end and guide it to its resting place on the load. A clever crane operator can assist tremendously in this, but accidents in this type of loading are numerous and serious.

A device, not much used in the East as yet for this type of loading, is the heel boom. This consists merely of a steel or spiked wooden plate mounted on the front of the boom. With this device, the log is hooked a little to one side of the center of gravity, and as the log is lifted the crane operator catches the upper end as it swings against his heel boom. It is clamped there as he continues reeling in his line raising the log above the load and swinging the opposite end above its intended resting position. Then he lets down the front end in the exact spot where it is to ride. Then, by clever manipulation of his cable and the boom, he unloosens the back end from the spikes in the heel and swings it to its proper position on the load. About all the top loader has to do is to indicate where the log is to be

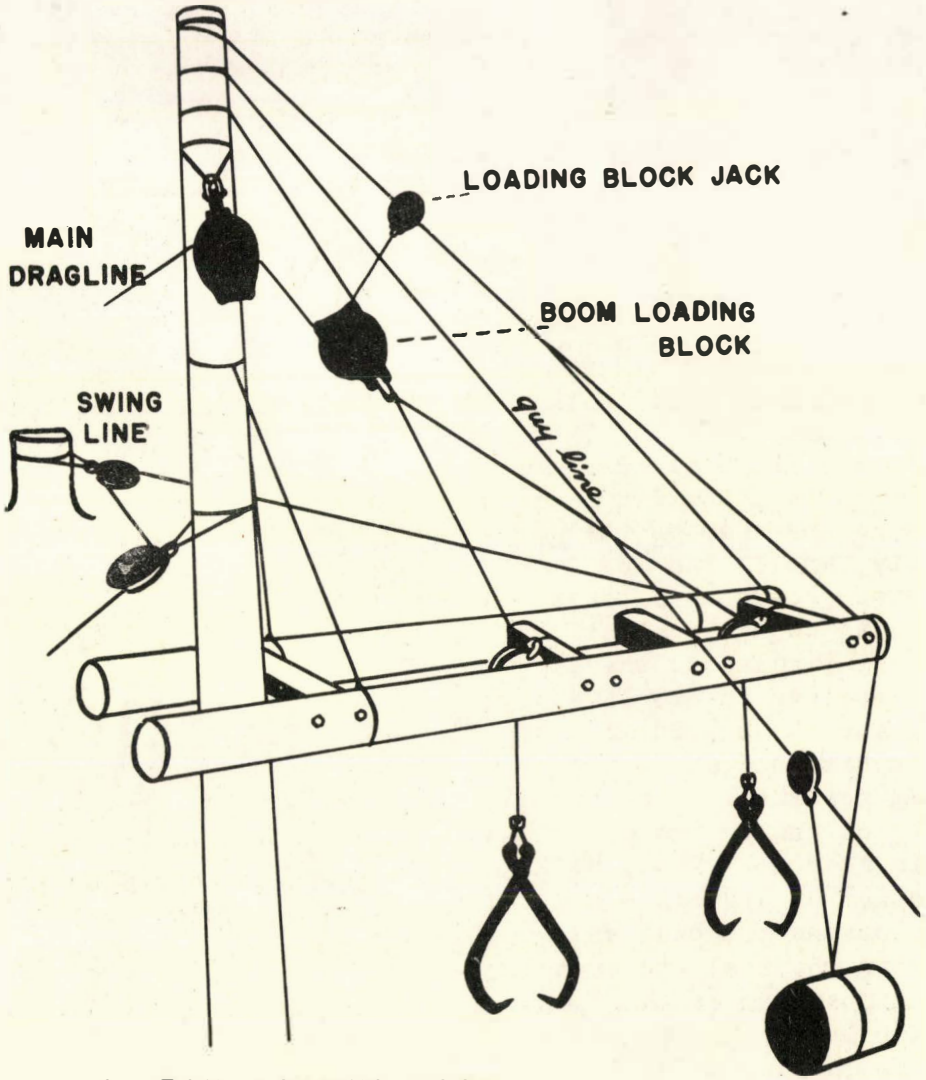


HEEL BOOM

placed and detach the tongs. A great deal of experience and practice are necessary to make a good heel boom operator, but once the art is learned, loading can be done with this device much more quickly, and even more important, more safely than without it.

If a great deal of loading is to be done at one place, one of the more permanently located loading devices commonly used in the West might be considered. Since these operate with double tongs they are also safer and faster than the single tong cranes.

One is the McLean boom illustrated here: A spar tree is chosen, or planted in the desired location. From it, after it has been topped and guyed, is hung a boom made of two sturdy poles bolted together with

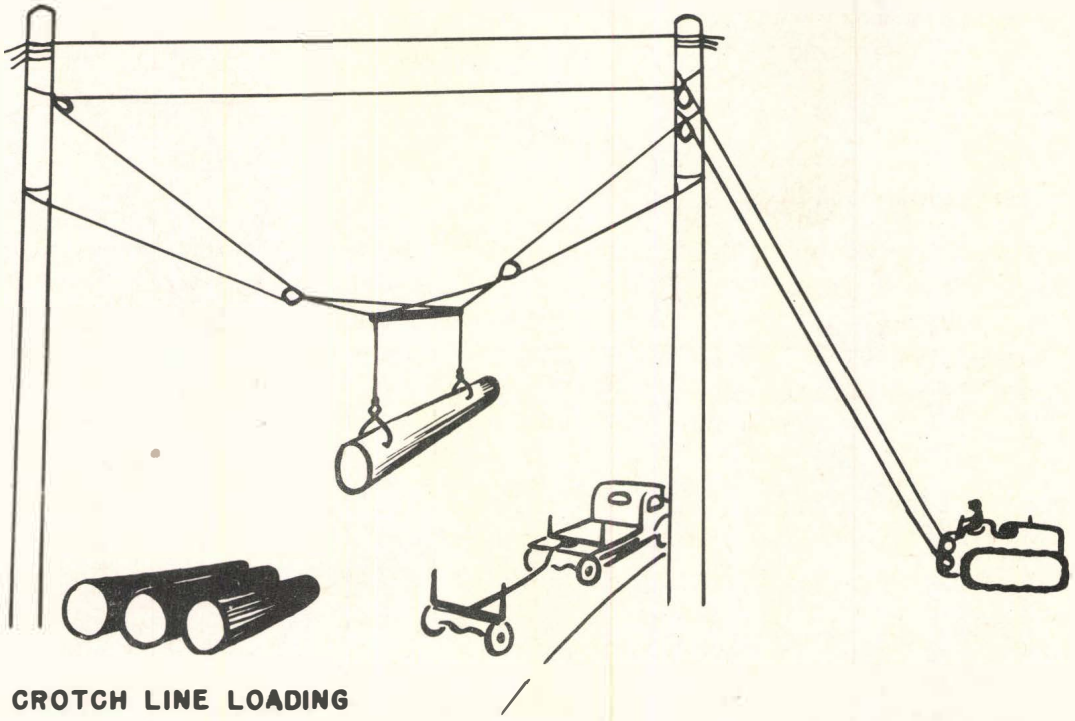


McLEAN LOADING BOOM

long bolts and held apart a little farther than the diameter of the tree with wooden spreaders. If a counterweight swing is used, as illustrated, only one swing line is needed to carry the boom with its load to its position over the truck to be loaded. The counterweight will swing it back when the single swing line is reeled out. The main drag line is divided before it goes down over the two sheaves mounted in the boom to the tongs which lift the load, one section being just enough longer than the other so that the tongs are lifted and lowered at the same time.

Power for such a loader can be furnished by a double drum winch on the back of a tractor, or by a similar winch powered by an automobile engine mounted on skids.

The other loading system, requires two spars but provides for picking up or dropping the logs at any point between them. The usual system is to have the log supply at one side of this space and the truck road at the other. This is illustrated below:



CROTCH LINE LOADING

The spreader for the tong lines is usually a length of old railroad rail, with holes bored at either end for the necessary clevises. The power for this device can also be supplied by a double drum winch on a tractor or attached to a gas engine.

In all these loaders that pick up the log and swing it through the air, special attention should be given to the wire rope and the

sheaves and fittings used with it. Much of the information given in the preceding two sections on this almost indispensable adjunct to modern logging applies to loading; also, some of it with even greater force, because heavy loads are swinging through the air at the loading point immediately around where men are working.

In the interests of economy, speed, and safety, wire rope of adequate strength should be used together with thr proper fittings. Clips to fasten wire rope are out of place on loaders, particularly on live lines as they are on skidding devices. They may often be used advantageously on guy lines, but they cannot be expected to feed through sheaves properly, and they cannot be expected to develop sufficient strength for lead and swing lines. Blocks of the right design and of sufficient diameter should be used. A good rule of thumb is that the minimum diameter of sheave that should be used is 20 times the rope diameter. Consequently for 1/4" rope the smallest sheave used should be 5". For 1/2" rope it should be 10".

Wire rope on loaders is often subject to severe reverse stresses, and to many jerks. Consequently 6 x 19 preformed plough steel should be used of a sufficient diameter to carry the intended loads with an ample factor of safety. It should be lubricated frequently and thoroughly, and special care should be given to spooling it evenly on the drums, making sure that it is not subject to unnecessary abrasion in blocks and sheaves. Periodic and careful inspections should be made of all rope in use. Kinked, badly abraided, crushed or nicked rope should be cut out and discarded, or relegated to some less important and dangerous use.

Loading Tree Length Logs

Many of the devices described in the foregoing discussion can be extended to handle tree length logs. Loading such material from a skidway onto a long truck and trailer is pictured here:

The use of cross haul for loading tree length material is illustrated below:

Tree lengths are also loaded with cranes and shovels with long booms. The stationary McLean and Crotch line loaders are especially adapted to use for tree length material.

In this latter machine the load is assembled with the aid of the two tong lines from a rather extensive log yard. With the two independent lines each attached to a separate winch it is possible to horse the tree lengths around from almost any position, and place them in front of the preloader, with one end resting on the crosspiece between the boom legs and the other on the ground. When a load has been assembled, and a truck arrives, a piece of wire rope with spliced eyes in either end is hooked onto the two prongs of the front tong. Then the line going to this tong is tightened raising the front end of the load so that the truck can back under it to a point where its rear bunk engages the rear end of the load. Then the load is dropped onto the front bunk, the cable removed, the load chained down and started on its way. When the truck is out of the way the jammer can start assembling another load.

Unloading long logs is usually done by driving the load up alongside the landing place or pond on a tilt, releasing the stakes, or tie chains, and letting the logs roll sideways off the bunks. Usually it is necessary to roll some of them off with a canthook. With long logs, particularly, it is necessary to provide a level bed for them to land on, to prevent breakage. Level dirt provides a springy landing, if it does not contain big rocks. In some cases, particularly where there is a steep slope down to a log pond, a permanent rollway of round or square timbers at a considerable angle will be more satisfactory, and prevent undermining the roadway and carrying dirt into the pond.

When space is limited, and there is no pond, logs are frequently decked in the yard by a crane, crotch line, or A frame high lead. Usually they are dumped off the trucks and picked up by the device being used, but in some cases they are picked, either individually, or in bundles off the truck bunks.

Another system of unloading used rather infrequently is a pusher device, usually mounted on a tractor in a manner similar to that used for a bulldozer blade.

Some Manufacturers of Chain Conveyor Equipment Suitable For Loading

Link Belt Company, Philadelphia 40, Pennsylvania
Jeffrey Manufacturing Company, Columbus, Ohio
Chain Belt Company, Milwaukee, Wisconsin.

Some Manufacturers of Log and Bolt Loaders

Ottawa Car and Aircraft, Ltd., Ottawa, Canada (Bouffard loader)
Noble and Wood Machine Company, Hoosick Falls, N.Y. (Pulpwood Flipper)
Silent Hoist Winch & Crane Co. 841-877, 63rd St. Brooklyn, N.Y.
(Jib boom for truck)
Taylors Machine Works, Louisville, Miss. (Loggers' Dream)
Blaw Knox Division, Blaw Knox Corp. Pittsburgh, Pa. (Pulpwood Grapple)

Some Manufacturers of Cranes and Shovels Suitable for Loading

Austin Western Road Machinery Company
Aurora, Ill.

Bay City Shovels, Inc.
Bay City, Mich.

Bucyrus Erie Company
South Milwaukee, Wisc.

General Excavator Company
Marion, Ohio

Harnischfeger Corp.
Milwaukee, 14, Wisc.

Lima Locomotive Works, Inc.
Lima, Ohio.

Link Belt Speeder Corp
301 W. Pershing Road
Chicago, Ill.

Michigan Power Shovel Co.
Benton Harbor, Mich.

The Osgood Company
Marion, Ohio.

Quickway Truck Shovel Co.
Denver, Colo.